

The Role of Waves in the Circulation of the Arctic Middle Atmosphere  
during IPY 2007-2008 and 2008-2009

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Using a network of Rayleigh lidars we have documented the gravity wave activity at several Arctic sites during the IPY winters. These winters are marked by significant planetary wave activity that resulted in stratospheric sudden warmings and disruption of the polar vortex, and the general circulation. We present a detailed analysis of the gravity wave activity during the winters and explore interactions between the wave activity, the synoptic regime, and the mean flow. We discuss the interannual variability and compare the observations to other recent winters. We discuss the observations in terms of current circulation models and studies that suggest an ongoing increase in planetary wave activity associated with increase in greenhouse gases.